

## CLAIMS

1. A balloon catheter (20,21) for positioning of a stent (9) in coronary or peripheral  
5 angioplasty, the catheter comprising a hollow conduit (22) with an open proximal end (23)  
and a closed distal end (25) and having an expandable section (24) with an outer surface  
part adapted to hold a stent and having no bifurcations or side openings, one or more  
guidewire lumens or grooves (30,34,37) to provide passage for two or more guidewires  
(5,7) through a stent to be held by said outer surface part of the expandable section.
- 10 2. The balloon catheter (20,21) according to claim 1, wherein the one or more guidewire  
lumen(s) (30,34) provide(s) passage for two or more guidewires (5,7) inside said outer  
surface part of the hollow conduit (22) from one or more open end part(s) of the one or  
more guidewire lumen(s) proximal to said outer surface part and through the closed end  
15 (25) of the hollow conduit distal to said outer surface part.
3. The balloon catheter (20,21) according to claim 1 wherein the catheter is an over-the-  
wire or a rapid exchange type catheter.
- 20 4. A balloon catheter (20,21) for positioning of a stent in coronary or peripheral  
angioplasty, the catheter comprising a hollow conduit (22) with an open proximal end (23)  
and a closed distal end (25) and having an expandable section (24) for holding and  
expanding a stent (9) ,
- 25 the balloon catheter being characterised in that
- it further comprises one or more guidewire lumens or grooves (30,34,37) extending along  
at least part of the expandable section (24) and providing passage for at least two  
guidewires (5,7) inside the expandable section so that, after expansion of a stent (9) by  
30 the expandable section (24), the at least two guidewires run through the stent from end to  
end, and in that
- the expandable section (24) has an outer perimeter with no bifurcations or side openings.
- 35 5. A balloon catheter (20,21) for positioning of a stent in coronary or peripheral  
angioplasty, the catheter comprising a hollow conduit (22) with an open proximal end (23)  
and a closed distal end (25) and having an expandable section (24) for holding and  
expanding a stent (9),

the balloon catheter being characterised in that

it further comprises one or more guidewire lumens or grooves (30,34,37) extending along at least part of the expandable section (24) and providing passage for at least two  
5 guidewires (5,7) inside the expandable section so that, after expansion of a stent (9) by the expandable section, the at least two guidewires pass through the stent from end to end, and in that

it is adapted to position the stent (9) in a principal vessel (2) proximal to the bifurcation  
10 (1) without entering either branch (4,6) distal to the bifurcation with the expandable section (24).

6. The balloon catheter (20,21) according to any of claims 1 to 5, wherein the expandable section (24) comprises a cylindrical central section (27) for holding a stent (9), and where  
15 a distance from the distal end of the cylindrical central section to an inlet of a first guidewire lumen or groove is less than 8 mm.

7. The balloon catheter according to claim 6, wherein said distance is less than 6 mm.

20 8. The balloon catheter according to claim 6, wherein said distance is less than 2 mm.

9. The balloon catheter (20,21) according to any of claims 1 to 5, wherein said one or more guidewire lumen(s) (81) extend(s) beyond an extreme distal end of the expandable section (24) and is divided into two or more individual guidewire lumens (96,98) at a  
25 position of exit (99) from the extreme distal end (85) of the expandable section.

10. An assembled stent delivery system comprising a balloon catheter (20,21) according to any of claims 1 to 9 and a stent (9) held by the expandable section (24) of the hollow conduit (22) so that the one or more guidewire lumen(s) or groove(s) (30,34,37)  
30 provide(s) inlets and outlets (31,32,35,36) for two or more guidewires (5,7) distally and proximally to the stent (9).

11. An assembled stent delivery system comprising two or more balloon catheters (70,72) extending in parallel to each other and a stent (9) held by and circumventing  
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expandable sections of at least two of the two or more balloon catheters

or

an expandable section of a first balloon catheter (70) and a non-expandable section of a second balloon catheter (72),

the system thereby providing passage for two or more guidewires through the stent.

12. The assembled stent delivery system according to claim 11, wherein the catheters are  
5 over-the-wire and/or rapid exchange type catheters.

13. The assembled stent delivery system according to any of claims 10 to 12, wherein the stent is coated with one or more anti proliferative medical agents.

10 14. The assembled stent delivery system according to any of claims 10 to 13, wherein the stent is bio degradable.

15 15. A catheter for positioning of a self-expanding stent in coronary or peripheral angioplasty, the catheter (40) being an over-the-wire and/or a rapid exchange type catheter comprising a self-expanding stent (41) mounted on a distal end section of the catheter, a sheath (42) keeping the self-expanding stent in a compressed state, and one or more guidewire lumens or grooves (30,34,37) providing passage for two or more guidewires (5,7) through the self-expanding stent.

20 16. A method for positioning a stent (9) in a principal vessel (2) proximally to a bifurcation (1), the method comprising the steps of:

- inserting a distal end of a first guidewire (5) through the principal vessel (2) and into a first branch (4) of the bifurcation (1),
- inserting a distal end of a second guidewire (7) through the principal vessel (2) and  
25 into a second branch (6) of the bifurcation (1),
- providing a first catheter (20) for positioning of a first expandable stent (9) mounted on a distal end section of the catheter, the first catheter comprising one or more guidewire lumen(s) (30,34) providing passage for two or more wires (5,7) through the stent from end to end,
- 30 – threading the one or more guidewire lumen(s) (30,34) with proximal ends of the first (5) and the second wire (7),
- advancing the first catheter (20) simultaneously over the first (5) and the second wire (7) until the first stent (9) reaches the principal vessel (2) proximal to the bifurcation (1), and
- 35 – expanding the first stent (9).

17. A method for positioning stents (61,63) at a bifurcation (1) of an artery and in a principal vessel (2) proximally to the bifurcation (1), the method comprising positioning a

stent (9) in the principal vessel (2) proximally to the bifurcation (1) according to claim 16, the method further comprising the steps of:

- withdrawing the first catheter (20) simultaneously over the first (5) and the second wire (7),
- 5 - threading and advancing a second catheter (60) mounted with a second expandable stent (61) over the first guidewire (5) and at least partially into the first branch (4) of the bifurcation (1), and
- expanding the second stent (61) of the second catheter (60).

10 18. The method according to claim 17, wherein the step of advancing the second catheter comprises advancing the second catheter (60) so that a distal end of the second stent (61) is positioned in the first branch (4) of the bifurcation (1) and a proximal end is positioned inside the first stent (9).

- 15 19. The method according to claim 17 or 18, further comprising the steps of:
- threading and advancing a third catheter (62) mounted with a third expandable stent (63) over the second guidewire (7) and at least partially into the second branch (6) of the bifurcation (1), and
  - expanding the third stent (63) of the third catheter (62).

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20. The method according to claim 19, wherein the step of advancing the third catheter (62) comprises advancing the third catheter (62) so that a distal end of the third stent (63) is positioned in the second branch (6) of the bifurcation (1) and a proximal end is positioned inside the first stent (9).

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21. A method for fabricating a catheter according to any of claims 1-9 or 15.

22. The use a catheter according to any of claims 1-9 or 15 for performing angioplasty.

30 23. The catheter according to any of claims 1-9 or 15 for use in coronary angioplasty on humans.